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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Livestock Division
Washington 25, D. C.

INSTRUCTIONS FOR TESTING LIVESTOCK SCALES UNDER
REGULATIONS OF THE PACKERS AND STOCKYARDS ACT

Foreword

Regulations issued under authority of the Packers and Stockyards Act require that stockyard owners, market agencies and packers who are subject to the Act and who own or operate livestock scales used for purposes of purchase or sale in commerce ".....shall cause such scales to be tested properly by competent agencies at suitable intervals in accordance with instructions of the Chief....." It is also required that reports of such scale tests shall be supplied the Packers and Stockyards Branch through its local district supervisors. The following will explain the general requirements, provide instructions for testing and recording procedure and illustrate the latter on a sample report form.

1. A proper test is one which fully discloses the accuracy and other performance qualities of the scale under all conditions which may prevail during actual use. It requires the application of standard-weight test loads in several successive stages up to the maximum capacity at which the scale is used; it includes separate tests of individual components such as fractional bars, poises, notches and main levers or sections which may independently affect weighing accuracy; it demands a reasonably exact evaluation of the errors which develop under various degrees or positions of platform load; finally it requires the recording in permanent form of all pertinent data observed during the test.

A competent test agency is one which employs experienced personnel and a sufficient amount of standard test weights to conduct tests in accordance with the procedure described in the instructions which follow. Agencies which the Branch considers competent, on that basis, include several State Weights and Measures Departments, a few railroad scale departments, many commercial scale repair and service companies and some stockyards or packers having adequate test equipment and employing a qualified scale mechanic or service man.

A suitable interval between tests, in the opinion of the Branch, is one of not more than six months. In instances where tests and inspections disclose that a scale does not maintain its accuracy between tests or is otherwise undependable or is mechanically deficient as regards construction, installation or maintenance, tests at lesser intervals may be required.

The instructions which follow describe official test procedure for live-stock scales of the weighbeam type. Procedure for automatic-indicating

scales with dials and printers is similar except that test loads should be applied in 100 pound stages up to 1000 pounds and in 1000 pound stages up to the value of the heaviest loads weighed, with a record made of the weight value printed at each load.

"Dual-weighing" installations consisting of one weighbeam and one dial installed to function independently of each other shall be tested by observing and recording separately the performance of each unit.

OFFICIAL TEST PROCEDURE

- (1) The scale platform should be cleaned of debris and foreign matter which might adhere to the test weights or otherwise be removed during test and cause a change in zero load balance. No other changes or cleaning should be performed since it is important that the scale be tested "as found" if the results are to truly indicate characteristic weighing performance.
- (2) Next, with the stock rack gates secured in "clear" positions and with all poises at zero, the scale should be accurately balanced with 20 or 25 pounds of small denomination weights on the platform. These "balance" weights will be used to accurately measure errors and balance changes during the test. The balance ball is not to be moved during the test.
- (3) The S. R. (Sensibility Reciprocal) value at zero load should be determined by increasing or reducing the amount of balance weights on the platform until appropriate change in the rest point of the beam or balance indicator is obtained.
- (4) The subfractional bar of the weighbeam is next to be tested by setting it successively at 50 pounds and at its capacity position (usually 95 pounds) with equivalent test loads at the center of the platform and with changes in the balance weights as are necessary to obtain correct balance. The fractional bar is then restored to its zero position and the intermediate fractional bar, usually graduated to 1,000 pound capacity by 100 pound intervals, is next tested by similar procedure at alternate notches.
- (5) When the fractional bar tests have been completed and the results recorded, the test weights should be removed from the platform and, with all poises set at zero, the scale is to be carefully balanced--not with the balance ball--but by means of the balance weights on the platform. Any change from the original amount of balance weights will represent a zero balance change and the new amount will be the basis on which errors at succeeding stages of the test are computed.
- (6) The test should then continue with the main poise set at successive 1,000 pound notches and with test loads of corresponding value applied

~~STANDARD~~

to the platform in reasonably uniform distribution pattern. At each load the amount of balance weights should be increased or reduced as required to produce correct balance of the weighbeam or indicator and any difference between the values for zero load and for the load at a given notch shall represent the error value. These tests should proceed up to the maximum load at which the scale is used. The S. R. value at the latter load should be determined as previously described.

(7) The test weights are then to be removed from the platform and the zero balance again checked by means of the small balance weights.

(8) Individual corners of the scale should next be tested by applying to each, in turn, test weights equal approximately to one-fourth the value of the largest distributed load, the procedure being otherwise as previously described. In the case of multiple section scales, a separate test should be made of each section with test loads concentrated on each, in turn.

(9) When the corner or sectional tests have been completed, the test weights should be removed and the zero balance checked to observe the amount of any change.

(10) Printed weight values should be checked for accuracy and legibility by operating the weight-recording device at representative loads and observing the results.

RECORD OF TEST RESULTS

The results of each test should be recorded in full detail on official forms No. L.S.-212 provided by the Branch. (An exception may be made in the case of a state or municipal agency which utilizes forms supplying substantially the same information as is provided for on the official Branch forms)

Essential information to be recorded includes:

1. Identification of the scale by ownership, location, scale number and species of livestock weighed.
2. Identification of the scale testing agency, the individual conducting the test and the local Branch representative present during the test.
3. The date of the test and of the last preceding test.
4. The nominal capacity of the weighbeam or other indicating element and the value of the minimum graduations on weighbeam or dial face.
5. A statement of the heaviest livestock loads weighed and of the lightest livestock loads weighed.

6. Data showing the amount and position of applied test loads, the S. R. value at zero and capacity loads, the errors in indicated or printed weight values and the amount of zero balance changes, if any, which develop when test loads are removed.

The test results and other observations are to be recorded on the report under the proper headings as the test proceeds and immediately after observations are made. One original and two carbon copies of the report should be prepared, the original being forwarded to the district supervisor of the Packers and Stockyards Branch, one copy being retained by the scale owner and one by the scale testing agency.

REPORT FORM ILLUSTRATED

To illustrate execution of official report form L.S.-212 there is attached hereto a sample record of a livestock scale test conducted in compliance with official instructions. In this particular example, to conserve time, only odd-numbered hundred and thousand-pound notches were tested; on the next succeeding test even-numbered notches would be similarly tested.

Entries at the top of the form identify the scale, the conditions of use, the testing agency, and the dates of the present and last preceding tests. Important items of information are those stating the values of the maximum and minimum loads weighed on the scale for they indicate to the inspector the range of test loads which should be applied.

Observation No. 1 records that the empty scale is accurately balanced with all poises at zero and with 20 pounds of small balance weights on the platform.

At Observation No. 2 the inspector records that the S. R. value was determined by reducing the balance weights from 20 pounds to 14 pounds, a difference of six pounds.

At Observation No. 3, with a 50-pound weight at the center of the platform (and the fractional poise at a corresponding indication), the amount of weight required to obtain balance does not differ from the original 20 pounds and the error is therefore zero.

At Observation No. 4, the difference in balance weights (20-19) represents an error of plus one pound.

Observation No. 7 records an error of 20 pounds minus 21 pounds or minus one pound.

At Observation No. 10, with the test weights removed and the poises at zero, it is recorded that 19 pounds of balance weights is required instead of the original 20 pounds, the difference representing a change of one pound in the zero balance.

Observation No. 15 illustrates a fairly typical example of wear in an individual notch contributing an abnormal error.

Subsequent observations register the computed errors for additional distributed loads and appropriate corner loads, as well as the S. R. value at capacity load and any zero balance changes.

(The four corners of a scale are numbered beginning with No. 1 at the far left-hand corner and proceeding in clock-wise direction as the observer stands at the weighbeam and faces the scale platform. Sections of a scale are numbered from left to right.)

REQUIRED ACCURACY

A livestock scale shall be considered inaccurate if, when tested in accordance with instructions, the error at any test load exceeds the tolerances shown in the appropriate column of the following table.

Test Load (pounds)	Tolerances in Pounds		
	Weighbeam Scales	Automatic-indicating Scales	
		Dial	Printer
100	2.0	3.0	3.0
200	2.0	3.0	3.0
300	2.0	3.0	4.0
400	2.0	3.0	4.0
500	2.0	3.0	5.0
1000	2.0	3.0	5.0
2000	3.0	4.0	6.0
3000	4.5	6.0	8.0
4000	6.0	8.0	10.0
5000	7.5	10.0	12.0
6000	9.0	12.0	14.0
7000	10.5	14.0	16.0
8000	12.0	16.0	18.0
9000	13.5	18.0	20.0
10000	15.0	20.0	22.0
15000	22.5	30.0	32.0
20000	30.0	40.0	42.0
etc.			

The S. R. (Sensibility Reciprocal) of weighbeam scales not equipped with balance indicators shall not exceed twice the value of the minimum weighbeam graduation. For weighbeam scales equipped with balance indicators a change in platform load equal to the minimum weighbeam graduation shall move the rest point of the indicator a distance of not less than 3/8 inch. (S. R. requirements are not applicable to automatic-indicating scales.)

Scales which do not conform to the above defined requirements for accuracy and sensitiveness shall be adjusted, repaired or serviced to correct that

condition and shall be retested to verify their accuracy before they are used for weighing livestock.

INSPECTION REPORT

At the conclusion of the test the scale should be inspected thoroughly and any faulty conditions of installation, construction or maintenance which may affect weighing performance should be reported on inspection report form No. L.S.-213, a sample copy of which is attached. There should be included a report of any adjustments or repairs made at time of test and of any recommendations made for future repair, maintenance or replacement.

Sample Report

FORM LS-212
(8-13-54)

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

SCALE TEST RECORD

FORM APPROVED
BUDGET BUREAU NO. 40-R1796.1

PAGE NO.
1

SCALE OWNER

Union Stockyard Co.

SCALE LOCATION

Stockville, Alabama

SCALE NO.

2

SPECIES WEIGHED

Cattle

TEST BY (AGENCY)	TEST BY (PERSON)	TEST DATE	LAST TEST	SCALE CAPACITY	MINIMUM GRADS.	MAXIMUM LOADS	MINIMUM LOADS
State Smith - P.S.	J. Ryzwick	5/5/54	11/10/53	20000	5 lb	16000 lb	200 lb

DBS. ND.	TEST WEIGHTS		SCALE INDICATION (POUNDS)	BALANCE WTS: (POUNDS)	CORRECTION WTS. (POUNDS)	ERROR (5) — (6) (POUNDS)	REMARKS (ENTER S.R. VALUES AT ZERO AND MAXIMUM TEST LOAD)
	POSITION	POUNDS					
1	—	0	20	—	—	—	Zero Balance
2	—	0	14	—	—	—	S.T. = 6 lb.
3	Center	50	20	0	—	—	
4	η	95	19	+1	—	—	
5	η	100	20	0	—	—	
6	η	300	20	0	—	—	
7	η	500	21	-1	—	—	
8	η	700	21	-1	—	—	
9	η	900	21	-1	—	—	
10	—	0	19	—	—	—	1 lb. balance change
11	Distr.	1000	18	+1	—	—	
12	η	2000	17	+2	—	—	
13	η	3000	18	+1	—	—	
14	η	5000	16	+3	—	—	
15	η	7000	9	+10	x Notch Worn	—	
16	η	9000	15	+4	—	—	
17	η	11000	14	+5	—	—	
18	η	13000	11	+8	—	—	
19	η	15000	12	+7	—	—	
20	η	16000	13	+6	—	—	
21	η	16000	3	—	—	—	S.P. = 10 lb.
22	—	0	19	—	—	—	Zero balance check
23	Cor ^e 1	4000	16	+3	—	—	
24	η 2	4000	21	-2	—	—	
25	η 3	4000	19	0	—	—	
26	η 4	4000	18	+1	—	—	
27	—	0	20	—	—	—	1 lb. balance change
28							
29							
30							

Make entries in this column only if scale indication differs from test weight value in column 3.



Sample Report

FORM LS-213
(8-13-54)

FORM APPROVED
BUDGET BUREAU NO. 40-R1797.1

U. S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

LIVESTOCK SCALE INSPECTION REPORT

INSPECTION DATE	LAST INSPECTED	YEAR INSTALLED	SCALE NO.	MANUFACTURER	TYPE	SHOP OVERHAULED IN YEAR -
5/5/54	11/10/53	1950	2	Folsom	5	

SECTION I - REPORT FAULTY CONDITIONS ASSOCIATED WITH

- A. SCALE HOUSE: (REFER TO ITEM NO. IN COMMENTING ON CONDITIONS) 1. WEIGHBEAM, 2. POISES, 3. NOTCHES, 4. DIALS, 5. PRINTERS
6. BALANCE DEVICES, 7. INDICATORS, 8. SCALE TICKETS, ETC.

Weighbeam, notches and poises need cleaning.
7000 lb. notch worn.

- B. SCALE PLATFORM: (REFER TO ITEM NO. IN COMMENTING ON CONDITIONS) 1. APPROACHES, 2. STOCK RACK, 3. GATES, 4. COPINGS,
5. CLEARANCES, 6. VISIBILITY, ETC.

Insufficient clearance at left end of scale platform

- C. SCALE PIT: (REFER TO ITEM NO. IN COMMENTING ON CONDITIONS) 1. DRAINAGE, 2. ACCESSIBILITY, 3. FOUNDATIONS, 4. LEVERS,
5. PIVOTS, 6. BEARINGS, 7. CHECKING DEVICES, 8. LEVER CONNECTIONS, 9. EXTENSION LEVERS, 10. WEIGHBRIDGE, ETC.

Dirt accumulation interferes with main lever, No 2 Corner
Tight check rod No. 1 Corner
Weighbridge badly rusted

SECTION II - REPORT REPAIRS, ADJUSTMENTS OR CHANGES MADE AT THIS TIME

Cleaned beam, notches and poises
Adjusted check rods

SECTION III - SUBMIT ADVISABLE RECOMMENDATIONS FOR REPAIR, REPLACEMENT, ETC.

- Increase clearance at left end of platform
- Clean scale pit. Wire brush & paint weighbridge
- Provide cover for weighbeam. Shop repair beam.

SCALE INSPECTOR

J. Rygwick



1 C 2 C 3 C 4 C 5 C 6 C 7 C 8 C 9 C 10 C 11 C 12 C 13 C			
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